EP Series
User's Manual

Caution!

This manual is important instruction that you should follow during installation and maintenance of the inverter. Please read all instructions before operating the equipment and save this manual for future reference.

SIMTEK POWER SERVICES
Sunset Lane 2,Phase 2 (ext),
DHA,Karachi.
021-35386004
021-35394140
0322-2572227
0332-2572227
0345-2215071

COMBINED INVERTER CHARGER
PURE SINE WAVEFORM

CONTENTS

1. PRODUCTS SKETCH MAP 1
2. EP SERIES BASIC WIRING 2
3. LINE MODE SPECIFICATION 4
4. INVERTER MODE SPECIFICATION 5
5. CHARGE MODE SPECIFICATION 6
6. CHARGE MODE SPECIFICATION 7
7. DISPLAY & CONTROL 8
8. GENERAL SPECIFICATION 10
9. APPENDIX 11

SIMTEK® POWER SERVICES

1. PRODUCTS SKETCH MAP

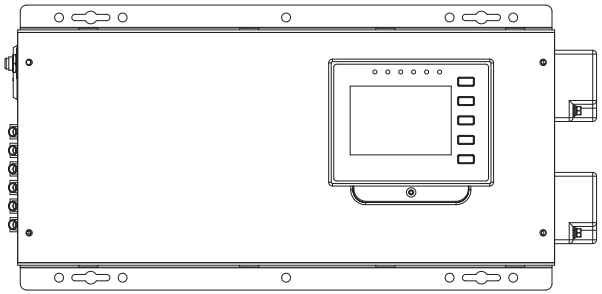


Figure 1 top view

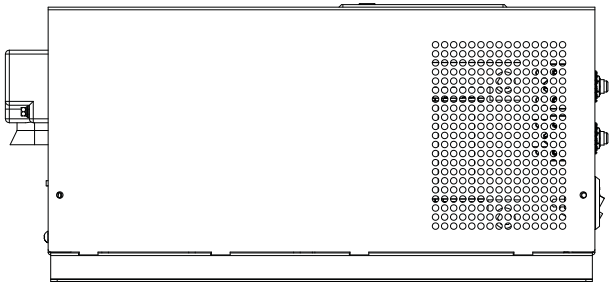


Figure 2 side view

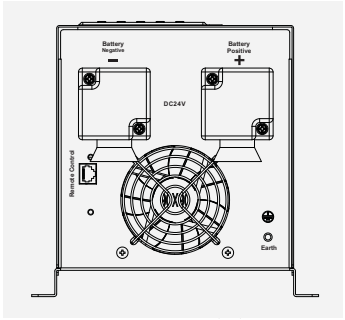


Figure 3 DC side

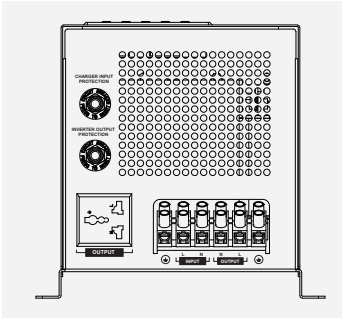
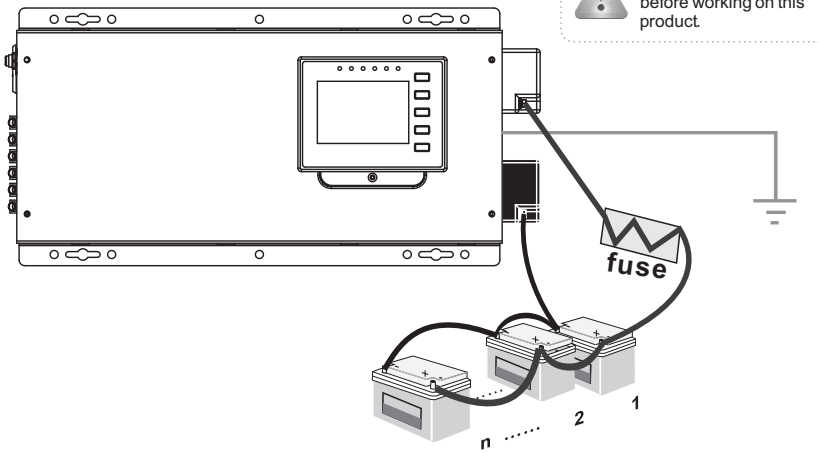


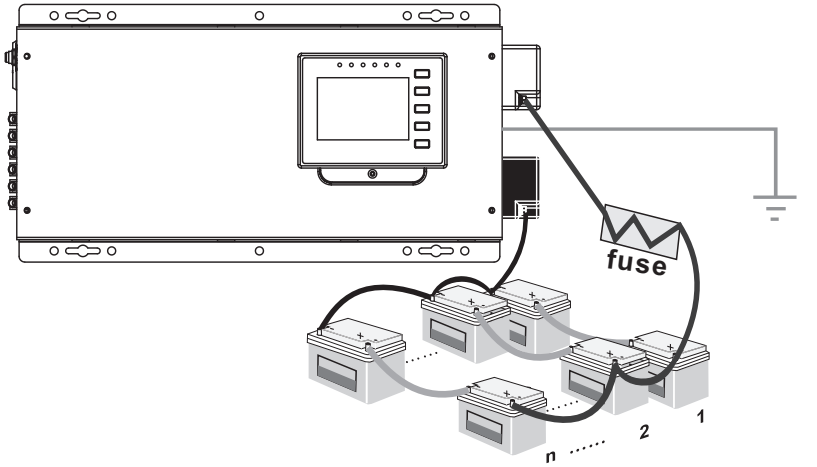
Figure 4 AC side

2. EP SERIES BASIC WIRING

Warning:High voltage,do not open unless qualified to do so; Please read instructions before working on this product.

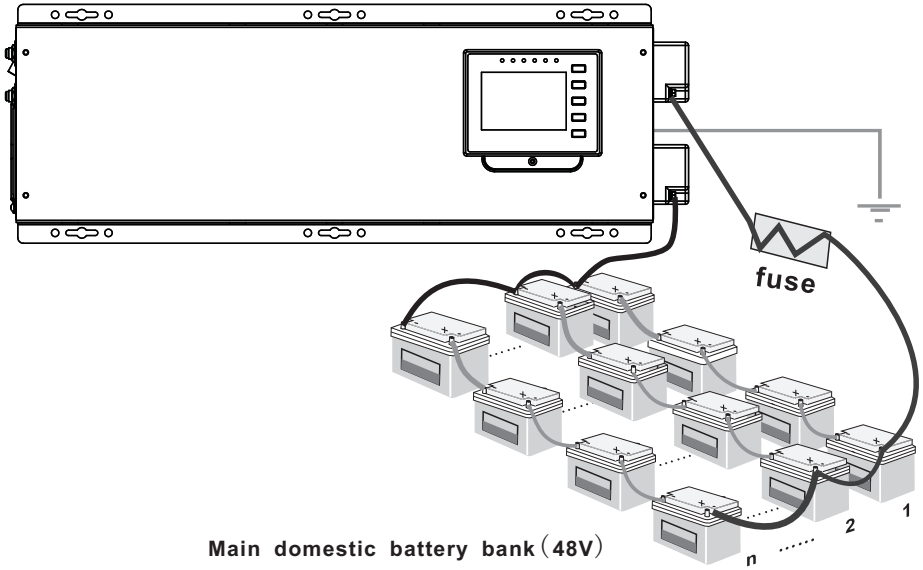


Main domestic battery bank（12V）

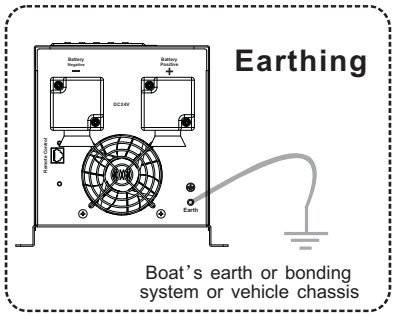


Main domestic battery bank（24V）

www.simtek.com.pk



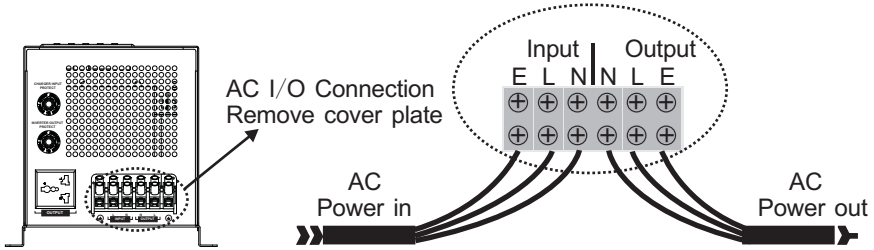
Main domestic battery bank（48V）



WHAT CABLE TO USE in mm^2:

A charger or inverter	cable run distance 0-1. 5m	cable run distance 1. 5-4. 0m
125-180A	50 mm^2	70 mm^2
180-330 A	70mm^2	90mm^2

Please note that if there is a problem obtaining for example 90 mm^2 cable, use 2*50mm^2, or 3*35mm^2, One cable is always best but, cables simply copper and all you require is the copper, so it does not matter if it is one cable or 10 cables as long as the square area adds up. Performance of any product can be improved by thicker cable and shorter runs, so please round up and keep the length as short as possible.



3. LINE MODE SPECIFICATION

MODEL	EP-1012	EP-2012	EP-2024	EP-3024	EP-4048	EP-5048	EP-6048
Input Voltage Waveform	Sinusoidal（utility or generator）						
Nominal Input Voltage	230Vac						
Low Line Disconnect	180Vac±4%						
Low Line Re-connect	190Vac±4%						
High Line Disconnect	265Vac± 4%						
High Line Re-connect	255Vac±4%						
Nominal Input Frequency	50Hz/60Hz (Auto detection)						
Low Line Frequency Re-connect	58±0.3Hz for 60Hz; 45±0.3Hz for 50Hz;						
Low Line Frequency Disconnect	57±0.3Hz for 60Hz; 45±0.3Hz for 50Hz;						
High Line Frequency Re-connect	64±0.3Hz for 60Hz; 54±0.3Hz for 50Hz;						
High Line Frequency Disconnect	65±0.3Hz for 60Hz; 55±0.3Hz for 50Hz;						
Output Voltage Waveform	As same as Input Waveform						
Over-Load Protection（SMPS load）	Circuit breaker						
Output Short Circuit Protection	Circuit breaker						
Efficiency（Line Mode）	>95%						
Transfer Time（AC to DC）	≤10ms（typical）						
Transfer Time（DC to AC）	≤10ms（typical）						

www.simtek.com.pk

4. INVERTER MODE SPECIFICATION

MODEL	HV MODEL						
	EP-1012	EP-2012	EP-2024	EP-3024	EP-4048	EP-5048	EP-6048
Output Voltage Waveform	Sine wave						
Rated Output Power(VA)	1000	2000		3000	4000	5000	6000
Rated Output Power(W)	1000	2000		3000	4000	5000	6000
Power Factor	0~1. 0						
Nominal Output Voltage(V)	230Vac						
Nominal Output Frequency(Hz)	50Hz±0. 3Hz						
Auto tracking Main Frequency(Hz)	Yes(Following Main first connection) 50Hz@45-54Hz 60Hz@55-64Hz						
Output Voltage Regulation	±10%rms						
Nominal Efficiency	>80%						
Over-Load Protection (SMPS load)	(100%<load<120%)±10%:Fault (shutdown output)after 2 minutes; (120%<load<140%)±10% :Fault (shutdown output)after 1 minutes, Load>140%±10%:Fault (shutdown output) after 20s						
Surge rating (10s)	3000VA	6000VA		9000VA	12000VA	15000VA	18000VA
Capable of starting electric motor	0. 5 HP	1 HP		2 HP	2 HP	3 HP	3 HP
Output Short Circuit Protection	Current limit (Fault after 10s)						
Inverter Breaker Size	Input:10A Output:7A	Input:15A Output:10A		Input:30A Output:15A	Input:35A Output:20A	Input:35A Output:25A	Input:40A Output:30A
Nominal DC Input Voltage	12V	12V	24V	24V	48V	48V	48V
Min DC Start Voltage	10V/20V/40V						
Low Battery Alarm	10. 5Vdc±0. 3Vdc for 12V battery 21. 0Vdc±0. 6Vdc for 24V battery 42. 0Vdc±0. 6Vdc for 48V battery						
Low DC Input Shut-down	10. 0Vdc±0. 3Vdc for 12V battery 20. 0Vdc±0. 6Vdc for 24V battery 40. 0Vdc±0. 6Vdc for 48V battery						
High DC Input Alarm &Fault	16Vdc±0. 3Vdc for 12V battery 32Vdc±0. 6Vdc for 24V battery 64Vdc±0. 6Vdc for 48V battery						
High DC Input Recovery	15.5Vdc±0. 3Vdc for 12V battery 31.0Vdc±0. 6Vdc for 24V battery 62.0Vdc±0. 6Vdc for 48V battery						
Power saver	Load ≤25W(Enabled on "P/S auto" setting of Remote control)						

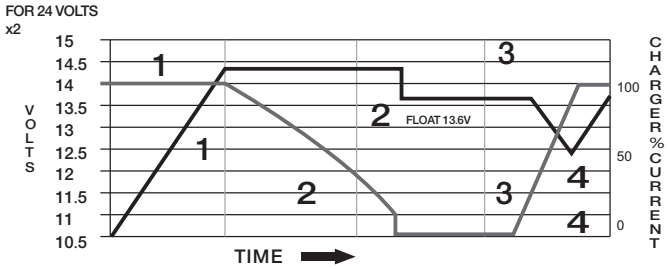
5. CHARGE MODE SPECIFICATION

MODEL	HV MODEL						
	EP-1012	EP-2012	EP-2024	EP-3024	EP-4048	EP-5048	EP-6048
Nominal Input Voltage	230Vac						
Input Voltage Range	180-250Vac						
Nominal Output Voltage	According to the battery type						
Nominal Charge Current	45A(Max.)						
Charge Current Regulation	±5Adc						
Charger Short Circuit Protection	Circuit breaker						
Breaker Size	Input:10A Output:7A	Input:15A Output:10A		Input:30A Output:15A	Input:35A Output:20A	Input:35A Output:25A	Input:40A Output:30A
Over Charge Protection	Bat. V≥15. 7Vdc/31. 4Vdc/62. 8Vdc, beeps 0. 5s every 1s &fault after 60s						
Charge Algorithm							
Algorithm	**Three stage**: ***Boost CC*** (Constant current stage) → Boost ***CV***(constant voltage stage) → Float(constant voltage stage)						

6. CHARGE MODE SPECIFICATION

Charge Stage Transition Definitions

- **Boost CC Stage**: If A/C input is applied, the charger will run at full currentin CC mode until the charger reaches the boost voltage.
- **Boost CV Stage**: In this stage, the charger will keep the boost voltage in Boost CV mode. The charging current will reduce, until less than 2A, then drop the voltage down to the float voltage.
- **Float Stage**: In float mode, the voltage will stay at the float voltage. If the A/C is reconnected or the battery voltage drops below 12Vdc/ 24Vdc/48Vdc, the charger wil reset the cycle above.



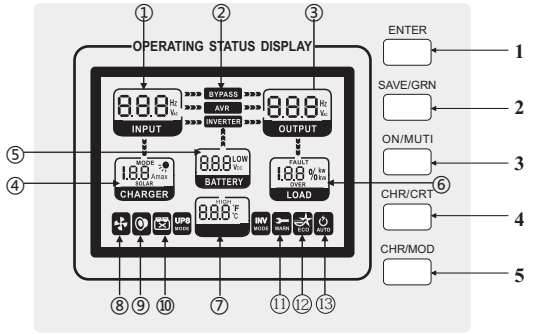
STEP 1=CONSTANT CURRENT CHARGE
STEP 2=ABSORPTTON CHARGE AT 14.4V
STEP 3=FLOAT VOLTAGE AT 13.6 VOLTS
STEP 4=LOW VOLTAE RESET TO STEP 1

Battery Type Setting

BATTERY TYPE SELECTOR

Switch setting	Description	Boost Voltage			Float Voltage		
		12V	24V	48V	12V	24V	48V
0	To be used by factory for set up	-		-	-		-
1	Gel USA	14.0	28.0	56.0	13.7	27.4	54.84
2	AGM 1	14.1	28.2	56.4	13.4	26.8	53.6
3	AGM 2	14.6	29.2	58.4	13.7	27.4	54.8
4	Sealed lead acid	14.4	28.8	57.6	13.6	27.2	54.4
5	Gel EURO	14.4	28.8	57.6	13.8	27.6	55.2
6	Open lead acid	14.8	29.6	58.2	13.3	26.6	53.2
7	Calcuim	15.1	30.2	60.4	13.6	27.2	54.4
8	De sulphation	15.5	31.0	62.0	4 hours then off		
9	Not used	-		-	-		-

7. DISPLAY & CONTROL



Instruction of the LCD display

Item	Indication	Description
①	**Display of input voltage and input frequency**	When the inverter is turned on,the LCD display shows input voltage,the input frequency of the display can be changed by switching the button.
②	**Working Status of INVERTER**	It shows the working status of the inverter. It shows "BYPASS"when the inverter is in AC mode. It shows "INVERTER" when it is in the battery mode. It shows "AVR" when it is in the "Boost Voltage" or " Buck Voltage" mode.
③	**Display of output voltage**	When the inverter is turned on, the display shows the real output voltage.
④	**Display of the Max.charging current and charging mode**	The inverter shows the Max.charging current when it is in the AC mode, It will shows the charging mode by switching the button.
⑤	**Display of the battery voltage**	When the inverter is turned on ,the display shows the real battery voltage. When the inverter is low battery,the buzzer beeps 0.5secs in every 5 secs, the display flashes and shows" LOW "with the beep.
⑥	**Display of load percentage**	The display shows the load percentage. When the inverter is overload, the buzzer beeps 0.5secs in every 1 sec, the display flashes and shows " OVER" with the beep. When the load is 100%-120%, the inverter will shut down after 2 minutes' alarm. When the load is 120%-140%, the inverter will shut down after 1 minute's alarm. When the load is >140%, the inverter will shut down after 20 secs alarm.
⑦	**Display of Temperature**	The display shows the current temperature of the heat sink. When the temperature is ≥100℃, the buzzer will beep 0.5 secs in every 1 minute, the display will flashes and show " HIGH" with the beep. When the temperature is ≥105℃, the inverter will shut down for self-protection.
⑧	**The fan is running**	The fan logo indicating inverter's fan is running.
⑨	**Silence function**	It shows the inverter is not in the silence mode. The silence function is inactive when it is low battery, over load and over temperature.
⑩	**The battery is disabled**	It shows the battery is disabled, it needs to replace the battery.
⑪	**Warning**	When the battery is over voltage, the buzzer beeps 0.5 secs every 1 second, the display flashes with the beep.
⑫	**Power saver mode**	It shows the "Power saver mode" is working. The inveter shut down the output automatically when in the battery mode and without any load, inverter automaticly has output when load is more then 40w.
⑬	**Auto re-start**	It shows the inverter will be start when AC is connected.

www.simtek.com.pk

Function of the button

Item	Function of the button	Description
1	Enter button	“OK” button for confirming the Max. Charging current or the charging voltage mode .
2	Green mode button	When the inverter is working, the "Green mode button" can be opened or closed by short pressing on the button.
3	Start / silence function/ input frequency	The inverter can be turned on or turned off by pressing the button for 3 secs. In battery mode, the " silence function" can be ON/OFF by shortly pressing the button. In AC mode, The input frequency will be displied by shortly pressing the button.
4	Choosing the Max. Charging current	When the AC is normal, shortly press the button, the display will keep flashing of ″The maximum charging current value″. Press ″ENTER” button for confirming this setting. If you did not press ″ENTER" button within 5 seconds, it will automatically return to the original setting of ″maximum charging current value.″
5	Choosing the charging voltage mode	When the AC is normal, shortly press the button, the display will keep flashing of ″The charging voltage″ for different tye of batteries. Press ″ENTER” button for confirming this setting. If you did not press ″ENTER" button within 5 seconds, it will automatically return to the original setting of ″charging voltage″.

Fault recovery	By restart the machine
FAN Operation	
Fan Operation	Variable speed fan operation is required in invert and charge mode. This is to be implemented in such a way as to ensure high reliability and safe unit and component operating temperatures in an operating ambient temperature up to 50℃. • Speed to be controlled in a smooth manner as a function of internal temperature and/or current. • Fan should not start/stop suddenly. • Fan should run at minimum speed needed to cool unit. • Fan noise level target < 60db. **The fan logic as below**:

Condition	Enter condition	Leave condition	Speed
HEAT SINK TEMPERATURE	T≤60℃	T>65℃	OFF
	65℃≤T<85℃	T≤60℃ or T≥80℃	50%
	T>85℃	T≤80℃	100%
Charge Current	T≤15%	T≥20%	OFF
	20%<T≤50%	T≤15% or T≥50%	50%
	T>50%	T≤40%	100%
Load% (Invert mode)	Load<30%	Load≥30%	OFF
	30%≤Load<50%	Load≤20% or Load≥50%	50%
	Load≥50%	Load≤40%	100%

8. GENERAL SPECIFICATION

Safety Certification	CE(EN62040-1)
EMC Classification	En62040 - 2, C2
Operating Temperature Range	0℃to 40℃
Storage temperature	-15℃~60℃
Operatio humidity	5% to 95%
Audible Noise	60dB max
Cooling	Forced air, variable speed fan
Size	EP-1012,EP-2012,EP-2024, EP-3024:461mm*217mm*178mm EP-4048, EP-6048:636mm*217mm*179**mm

9. APPENDIX

1.Indicator and Buzzer setting.

Status	Item	Buzzer
Line Mode	CC	×
	CV	×
	Float	×
Invert Mode	Inverter on	×
	Power saver	×
Alarm Mode	Battery Low	beep 0.5s every 5s
	Battery High	beep 0.5s every 1s
	Overload on invert mode	Refer to″Instruction of the LCD display″
	OverTemp on invert mode	beep 0.5s every 1s
	OverTemp on line mode	beep 0.5s every 1s
	Over charge	beep 0.5s every 1s
Fault Mode	Fan lock	beep continuous
	Battery High	beep continuous
	Inverter mode overload	beep continuous
	OverTemp	beep continuous
	Over charge	beep continuous
	Back Feed Short	beep continuous

SIMTEK POWER SERVICES
Sunset Lane 2,Phase 2 (ext),
DHA,Karachi.
021-35386004
021-35394140
0322-2572227
0332-2572227
0345-2215071